WHAT IS CLAIMED IS:

1. A method for converting fuel energy to electricity, comprising the steps of:

converting a higher molecular weight gas into at least one lower molecular weight gas;

supplying at least one of said lower molecular weight gases to at least one turbine to produce electricity;

electrochemically oxidizing at least one of said lower molecular weight gases in fuel cells adapted to produce electricity from said lower molecular weight gases.

2. The method for converting fuel energy to electricity of claim 1, further comprising the step of substantially dividing said lower molecular weight gases into at least two gas streams prior to said oxidizing step.

3. The method for converting fuel energy to electricity of claim 1, wherein at least one separation device is used for said dividing step, said at least one separation device being at least one selected from the group consisting of carbon fiber composite molecular sieves (CFCMS) and inorganic membranes.

4. The method for converting fuel energy to electricity of claim 1, wherein each of said lower molecular weight gases are electrochemically oxidized in said fuel cells.

5. The method for converting fuel energy to electricity of claim 1, wherein said fuel cells are solid oxide fuel cells.

6. The method for converting fuel energy to electricity of claim 1, further comprising the step of directing at least a portion of heat generated by said fuel cells for use in said converting step.

7. The method for converting fuel energy to electricity of claim 1, further comprising the step of generating heat from a nuclear reactor.

8. The method for converting fuel energy to electricity of claim 7, further comprising the step of directing at least a portion of heat generated by said nuclear reactor for use in said converting step.

9. The method for converting fuel energy to electricity of claim 8, further comprising the steps of heating said higher molecular weight gas using heat generated by said nuclear reactor, whereby said lower molecular weight gases are directed to at least one turbine after said converting step.

10. A method for converting fuel energy to electricity, comprising the steps of:

heating a higher molecular weight gas using heat generated by a nuclear reactor;

directing said higher molecular weight gas to at least one turbine to produce electricity;

converting said higher molecular weight gas into at least one lower molecular weight gas, and

electrochemically oxidizing at least one of said lower molecular weight gases in fuel cells adapted to produce electricity from said lower molecular weight gases.

11. A method for converting fuel energy to electricity, comprising the steps of:

providing a synthesis gas having a plurality of chemical components;

substantially dividing said synthesis gas into at least two gas streams; and,

supplying at least one of said gas streams to at least one fuel cell to produce electricity.

12. The method for converting fuel energy to electricity of claim 11, further comprising the step of driving at least one turbine with at least one of said gas streams.

13. The method for converting fuel energy to electricity of claim 11, wherein said step of providing a synthesis gas includes a reforming step.

14. The method for converting fuel energy to electricity of claim 13, further comprising the step of generating heat from a nuclear reactor.

15. The method for converting fuel energy to electricity of claim 14, further comprising the step of directing least a portion of heat generated by said nuclear reactor for use in said reforming step.

16. The method for converting fuel energy to electricity of claim 15, further comprising the steps of heating a higher molecular weight gas using heat generated by said nuclear reactor, said higher molecular weight gas adapted for providing said synthesis gas, and directing at least a portion of said heated higher molecular weight gas for use in said reforming step.

17. The method for converting fuel energy to electricity of claim 16, further comprising the step of driving at least one turbine with at least one of said gas streams.

18. The method for converting fuel energy to electricity of claim 15, further comprising the steps of heating a higher molecular weight gas using heat generated by a nuclear reactor, said higher molecular weight gas adapted for providing said synthesis gas, and directing at least a portion of said heated higher molecular weight gas to at least one turbine to produce electricity prior to said reforming step.

19. The method for converting fuel energy to electricity of claim 13, wherein a gas principally containing methane is reformed in said reforming step, whereby CO and H_2 are produced.

20. The method for converting fuel energy to electricity of claim 11, wherein at least one separation device is used for said dividing step.

21. The method for converting fuel energy to electricity of claim 20, wherein said at least one separation device is at least one selected from the group consisting of carbon fiber composite molecular sieves (CFCMS) and inorganic membranes.

22. The method for converting fuel energy to electricity of claim 11, further comprising the step of directing at least a portion of heat generated by said at least one fuel cell to a reformer.

23. The method for converting fuel energy to electricity of claim 11, wherein said synthesis gas includes CO and H_2, wherein said CO is substantially supplied to a fuel cell adapted to electrochemically oxidize CO and said H_2 is substantially supplied to a fuel cell adapted to electrochemically oxidize H_2.

24. The method for converting fuel energy to electricity of claim 11, wherein said at least one fuel cell is a solid oxide fuel cell.

25. The method for converting fuel energy to electricity of claim 23, wherein said CO fuel cell and said H_2 fuel cell are solid oxide fuel cells.

26. The method for converting fuel energy to electricity of claim 23, wherein CO_2 output by said CO fuel cell is used to produce additional energy.

27. The method for converting fuel energy to electricity of claim 25, wherein said additional energy is produced by said CO_2 driving a turbine.

28. The method for converting fuel energy to electricity of claim 11, wherein output streams from said at least one fuel cell are supplied to a combustion chamber for oxidation of fuel which has not been fully oxidized.

29. The method for converting fuel energy to electricity of claim 23, wherein air is supplied to said fuel cells, said air first being supplied to said CO fuel cell and then to said H_2 fuel cell.

30. The method for converting fuel energy to electricity of claim 23, further comprising the step of supplying air to a device for providing oxygen enriched air prior to delivery to said fuel cells.

31. The method for converting fuel energy to electricity of claim 11, wherein said step of providing a synthesis gas comprises reforming a hydrocarbon containing gas.

32. The method for converting fuel energy to electricity of claim 31, wherein said hydrocarbon containing gas is at least one selected from the group consisting of methane and natural gas.

33. The method for converting fuel energy to electricity of claim 31, wherein said hydrocarbon containing gas is supplied to a reformer at a pressure of at least approximately 8 atmospheres.

34. The method for converting fuel energy to electricity of claim 33, wherein said pressure is approximately at least 40 atmospheres.

35. The method for converting fuel energy to electricity of claim 11, wherein at least a portion of an output from said at least one fuel cell is directed to a gas turbine.

36. A system for converting fuel energy to electricity, comprising:

a reformer for converting a higher molecular weight gas into at least one lower molecular weight gas;

at least one turbine to produce electricity from expansion of at least one of said lower molecular weight gases, and

at least one fuel cell for electrochemically oxidizing at least one of said lower molecular weight gases to produce electricity.

37. The system for converting fuel energy to electricity of claim 36, further comprising at least one separation device for substantially dividing said lower molecular weight gases into at least one gas stream prior to said electrochemical oxidization step.

38. The system for converting fuel energy to electricity of claim 37, wherein said at least one separation device being at least one selected from the group consisting of carbon fiber composite molecular sieves (CFCMS) and inorganic membranes.

39. The system for converting fuel energy to electricity of claim 36, wherein each of said lower molecular weight gases are electrochemically oxidized in said at least one fuel cell.

40. The system for converting fuel energy to electricity of claim 36, wherein said at least one fuel cell are solid oxide fuel cells.

41. The system for converting fuel energy to electricity of claim 36, further comprising a structure for directing at least a portion of heat generated by said at least one fuel cell to said reformer.

42. The system for converting fuel energy to electricity of claim 36, further comprising a nuclear reactor for generating heat.

43. The system for converting fuel energy to electricity of claim 42, wherein at least a portion of heat generated by said nuclear reactor is directing to said reformer.

44. The system for converting fuel energy to electricity of claim 43, wherein heat generated by said nuclear reactor is used to heat said higher molecular weight gas.

45. A system for converting fuel energy to electricity, comprising:

a nuclear reactor for heating a higher molecular weight gas;

at least one turbine to produce electricity from expansion of said higher molecular weight gas;

a reformer for converting said higher molecular weight gas into at least one lower molecular weight gas, and

at least one fuel cell for electrochemically oxidizing at least one of said lower molecular weight gases to produce electricity.

46. A system for converting fuel energy to electricity, comprising:

a device for providing fuel having a plurality of chemical components;

a separator device for substantially dividing said fuel into at least two gas streams; and,

at least one fuel cell adapted for electrochemically oxidizing said gas streams.

47. The system for converting fuel energy to electricity of claim 46, further comprising at least one turbine, wherein said fuel is used to drive said turbine.

48. The system for converting fuel energy to electricity of claim 46, wherein said device for providing fuel is a reformer.

49. The system for converting fuel energy to electricity of claim 48, further comprising a nuclear reactor for generating heat.

50. The system for converting fuel energy to electricity of claim 49, wherein at least a portion of heat generated by said nuclear reactor is directed for use by said reformer.

51. The system for converting fuel energy to electricity of claim 50, wherein heat generated by said nuclear reactor is used to heat a higher molecular weight gas, said higher molecular weight gas adapted for providing said fuel.

52. The system for converting fuel energy to electricity of claim 51, further comprising at least one turbine, wherein said heated higher molecular weight gas is used to drive said turbines.

53. The system for converting fuel energy to electricity of claim 51, further comprising at least one turbine, wherein said at least one turbine is driven with at least one of said gas streams.

54. The system for converting fuel energy to electricity of claim 53, wherein a gas principally containing methane is reformed by said reformer, whereby CO and H_2 are produced.

55. The system for converting fuel energy to electricity of claim 46, wherein said separator device is at least one selected from the group consisting of carbon fiber composite molecular sieves (CFCMS) and inorganic membranes.

56. The system for converting fuel energy to electricity of claim 48, wherein a portion of heat generated by said at least one fuel cell is directed to said reformer.

57. The system for converting fuel energy to electricity of claim 46, wherein said fuel mixture includes CO and H_2, wherein said CO is substantially supplied to a fuel cell adapted to electrochemically oxidize CO and said H_2 is substantially supplied to a fuel cell adapted to electrochemically oxidize H_2.

58. The system for converting fuel energy to electricity of claim 46, wherein said at least one fuel cell is a solid oxide fuel cell.

59. The system for converting fuel energy to electricity of claim 57, wherein said CO fuel cell and said H_2 fuel cell are solid oxide fuel cells.

60. The system for converting fuel energy to electricity of claim 57, wherein CO_2 output by said CO fuel cell is used to produce additional energy.

61. The method for converting fuel energy to electricity of claim 60, further comprising a turbine, wherein said additional energy is produced by directing said CO_2 to said turbine.

62. The system for converting fuel energy to electricity of claim 46, further comprising a combustion chamber, wherein output streams from said at least one fuel cell are supplied to said combustion chamber for oxidation of fuel which has not been fully oxidized.

63. The system for converting fuel energy to electricity of claim 57, wherein air is supplied to said fuel cells, said air first being supplied to said CO fuel cell and then to said H_2 fuel cell.

64. The system for converting fuel energy to electricity of claim 57, wherein air is supplied to a device for providing oxygen enriched air prior to delivery to said fuel cells.

65. The system for converting fuel energy to electricity of claim 48, wherein said reformer converts a hydrocarbon containing gas to said fuel.

66. The system for converting fuel energy to electricity of claim 65, wherein said hydrocarbon containing gas is at least one selected from the group consisting of a mixture principally being methane gas and natural gas.

67. The system for converting fuel energy to electricity of claim 48, wherein said hydrocarbon containing gas is natural gas, said natural gas supplied to said reformer at a pressure of at least approximately 8 atmospheres.

68. The system for converting fuel energy to electricity of claim 67, wherein said pressure is at least 40 atmospheres.

69. A system for converting fuel energy to electricity, comprising:

a reformer for converting a higher molecular weight gas into at least one lower molecular weight gas, and

a nuclear reactor for providing at least a portion of heat required by said reformer for said converting.

70. The system for converting fuel energy to electricity of claim 51, further comprising at least one fuel cell for electrochemically oxidizing at least one of said lower molecular weight gases to produce electricity.